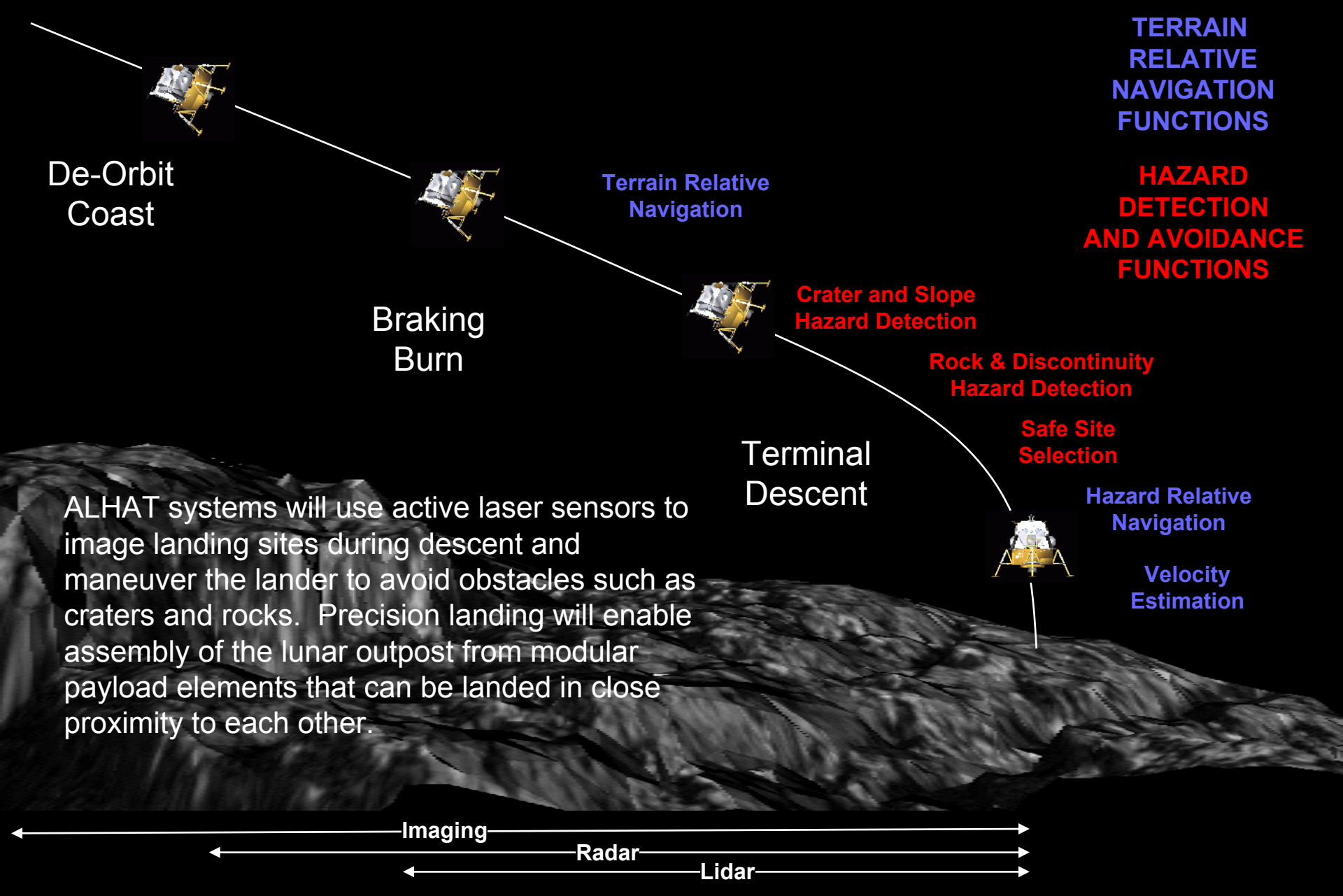
Potential ESMD Uses for Balloons

- Drop test of lunar lander to demonstrate descent propulsion system and autonomous precision landing and hazard avoidance system (2011).
  - Current plan is to use helicopter to carry half-scale lander to low altitude (~10,000 ft).
  - Balloon may needed to carry heavier payload.

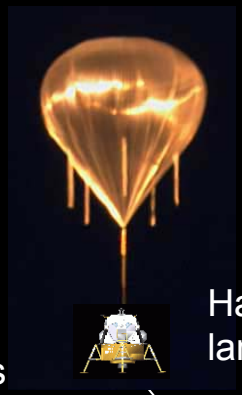
- Validation of radiation shielding materials and rad hard electronics (2009-2015)
  - High altitude (> 100,000 ft) flight over polar regions to expose payload to energetic galactic cosmic rays not deflected by Earth's magnetic field.
  - Balloon flights complement heavy ion accelerator testing at Brookhaven National Laboratory.
  - Dosimeters are used to measure effectiveness of shielding materials. Single event upsets are recorded for rad hard electronics.

- Advanced lithium-ion batteries being developed by ESMD could be used to power other balloon-borne experiments. (2009)

Autonomous Landing and Hazard Avoidance Technology (ALHAT)



Notional Drop Test of Lunar Lander



Balloon

Altitude 8,100 ft
Weight 7800 lbs

Half-scale
lander

Altitude 7,500 ft

Velocity 145 ft/sec

Altitude 20 ft
Velocity 5 ft/sec